Financial innovation and the liquidity frontier

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In the traditional model of financial intermediation, the sources and the process of liquidity creation through banks' balance sheets were particularly clear. The robustness of liquidity in such a regime is essentially based on the quality of the banks' assets and the credibility offered by the institutional framework within which they operate (deposit insurance, access to central bank money and more generally regulatory and prudential constraints).

In the current financial system, with the perpetual supply of new capital and risk transfer instruments, endogenous liquidity sources have undeniably diversified and grown, but they appear to be less stable and reliable. Financial innovation, to an extent, may have let market participants believe that they could, on an enduring basis, escape from the monetary constraint (the need for genuine cash) and that they could make do with the liabilities issued by other institutions to meet their liquidity needs.

However, market instruments can satisfy investors' liquidity preference only as long as the state of confidence in the marketplace supports them. Liquidity preference, which is intimately linked to asset price expectations, is indeed liable to shift swiftly at times, and to bring about runs on the most certain forms of liquidity (bank money, and worse, central bank money). Ultimately, the liquidity of financial assets depends on the trust that they can be redeemed on demand.

Such trust is probably more difficult to ascertain in the market-based, highly securitised world.

Still, crises may sometimes have educational virtues, and the turmoil of this summer has revealed some urgent needs to "robustify" the sources of liquidity in the system. It is now obvious that some additional suppliers of liquidity are needed in nearly absent secondary markets for complex structured credit products. This probably cannot be achieved without greater disclosure on the structures of investments among market participants. It is also clear that the containment of liquidity risk depends on the ability of financial institutions to properly price complex products, in their regular risk management process as well as in times of crisis.

The "liquidity frontier" cannot be pushed back indefinitely. Those who, in the end, accept illiquidity in their balance sheet must clearly understand and control the risks they are taking on. Such illiquidity is more acceptable for investors with long time horizons, and who are not subject to creditors suddenly calling in their money at short notice. For others, larger liquidity buffers acting as an automatic stabiliser to smooth the financial cycle might be necessary to hedge their risk.

Without such precautions, financial innovation could unduly extend the liquidity insurance implicitly expected of central banks. Yet, it is certainly not the role of a central bank to prompt market participants to rush into "not-so-reliable liabilities".

Over the last few years, investors have felt increasingly comfortable with risk seeking, due in part to the view that profitable, but illiquid investments, could easily be disposed of in the markets, thanks to a plentiful supply of money, low interest rates and the inflows of cash from developing and oil-exporting countries running surpluses with the US. Furthermore, the conviction that financial engineering would always allow risks to be offloaded to hundreds of other market participants has made this search for yield all the more attractive.

The current financial turmoil has at the very least shaken this common notion of "abundant liquidity" in world financial markets. It has shown that market liquidity can never be taken for granted, even in usually placid markets. This summer, not only were markets for securitized mortgages hit, but the core of interbank relationships have been endangered, prompting several central banks to provide substantial amounts of cash, at times in emergency liquidity assistance operations.

This episode of liquidity drain invites us to consider the structural changes that have affected the financial sector in recent decades and that have deeply changed the way liquidity is provided to the system. Throughout the post-Bretton Woods period, the world financial system has benefited from a continuous expansion of the availability and variety of financial instruments. New forms of intermediation and new financial products –especially those meant for the transfer of credit risk– have added flexibility to financial transactions and can be seen as a response to the demand for more liquid balance-sheets. Like in the past, this process of financial development and innovation has been a way to push back illiquidity constraints.[1] It has resulted in the creation of new sources of endogenous liquidity in markets, and simultaneously, moved banks away from their traditional monetary role, *i.e.* providing liquidity by making loans and taking deposits. Key in this process, securitization has enabled economic agents to obtain cash more readily against an array of future expected cash flows: from basic assets (loans, securities and receivables) as well as other securitized products such as subprime residential mortgage-backed securities, collateralised debt obligations (CDOs) or asset-backed commercial paper (ABCP).

This structural change towards more completeness in financial markets, raises the question of the robustness of this liquidity provision regime: are the new sources of liquidity sufficiently reliable? Is it possible to circumvent the monetary constraint on a long-term basis, *i.e.* continually produce substitutes for money through innovation without risking recurrent and distressing returns to the ultimate form of liquidity (central bank money)?

We will first attempt to clarify the way the "liquidity frontier" has been pushed back in the current financial system, which will reveal the conditions for liquidity creation. We will then examine to what extent such a regime may been moving closer to the limits of illiquidity.

1| A NEW LIQUIDITY PROVISION REGIME: PUSHING BACK THE LIQUIDITY FRONTIER

In an ideal world of "complete markets", every commodity is perfectly liquid and therefore liquidity is always available when it is needed. Liquidity provision would not be an issue in such a world. In incomplete (real) markets, having access to liquidity implies either trading in a market or bank contracts (deposit contracts or credit lines) that offer an option to withdraw when liquidity is needed.

Bank-based systems have naturally produced liquidity in the latter form essentially, through monetary intermediation. The evolution towards more market-based financial relationships does not mean, however, that financial intermediation has become less useful in the process of liquidity creation. On the contrary, competition in the financial sector has spurred the growth of non-bank institutions offering new products adapted to the liquidity preference of investors. The increased size of the financial market has even coincided with a shift away from direct participation by individuals in financial markets towards participation through various kinds of intermediaries such as investment or pension funds.[2]

1 *J.R. Hicks (1969) shows, for example, how the Second Industrial Revolution has been mainly a Financial Revolution, with the growth of capital markets, which made possible the financing of large-scale and highly illiquid investments such as railroad infrastructures.*
2 *See Allen and Santomero (1999).*

The current financial system would therefore be better characterised as an "intermediated-market based system".

In fact, financial intermediaries have always produced liquidity either by means of trading in markets or by asset transformation. What has fundamentally changed is not these functions but their relative proportion and their forms.

1|1 Liquidity provision through traditional bank intermediation

In less diversified financial systems, liquidity is essentially a product of banking activity through deposit-taking and loan supply. Such traditional monetary intermediation provides insight into the necessary conditions for liquidity to be created: the ability of banks to make their debt continuously acceptable (*i.e.* their ability to roll over their deposit-taking) in order to fund their loan supply (notably in the form of loan commitments).[3] The acceptability of demand deposits as money in turn rests on various characteristics of banks, notably the level of their capital, the quality of their assets and the institutional framework within which they operate (prudential supervision, deposit insurance, access to central bank money, etc.).

Confidence in the quality of the debt issued by banks is thus key to the continuity of liquidity production. This is the essential foundation for liquidity to exist.

The theory of financial intermediation suggests that the liquidity insurance offered by banks stems from their ability to transform assets. This transformation activity exists because banks are supposed to be better at pooling, selecting and monitoring investments than their depositors. In fact, any intermediary (whether bank or non bank) produces liquidity as long as it performs "qualitative asset transformation".[4] This is a conclusion that can be drawn from the seminal work of Gurley and Shaw (1960), which remains particularly relevant in the analysis of the activity of the non-monetary financial intermediaries that have grown in the last twenty years (mutual funds, pension funds, hedge funds, etc.). According to Gurley and Shaw, the function of financial intermediaries is to hold "primary debt securities" issued by economic agents with funding needs, and to collect resources among agents with surplus funds (investors) by issuing "indirect debt securities" that better meet their preferences than primary securities, notably in terms of liquidity. This function highlights the core business of financial intermediaries: customization of financial products, risk management and financial innovation. By absorbing some risks, reducing asymmetric information between lenders and borrowers as well as transaction costs, financial intermediaries are thus in a position to offer more liquid and acceptable assets to investors. Diamond and Rajan (2001) argue that the "fragile capital structure" of banks, subject to runs by depositors, is paradoxically a condition of their activity of liquidity creation. Without their typical balance sheet mismatch, they would simply mimic the market and would not add liquidity to the financial system. Thus, it is from their ability to absorb risks (counterparty risk, duration risk, market risk, etc.) and manage them credibly that their ability to create liquidity stems.

In recent decades, deregulation and increased competition in the financial sector have given impetus to a rapid movement of innovation. As a consequence, banks have been enticed to move to the "originate to distribute" model, by which they originate loans and then distribute the underlying risk to a myriad of outside investors by means of dedicated, innovative instruments. Banks have also purchased more willingly assets with the sole intention of reselling them. This new form of business model has deeply changed the modes of risk absorption in the financial system, and hence, has given rise to new forms of liquidity creation: less through monetary financing and more *via* capital market operations.

1|2 Capital markets as a growing source of endogenous liquidity

One of the fundamental consequences of the competition between banks and capital markets, as highlighted by Allen and Gale (1997), has been a change in the risk management function of banks. Traditionally, banks perform an "intertemporal

3 *As shown by Kashyap, Rajan, Stein (2002), there is a natural synergy between these two activities, as long as deposit withdrawals and commitment takedowns are not perfectly correlated.*

4 *This expression, attributable to Bhattacharya and Thakor (1993), refers to the transformation of maturity, unit amount and other characteristics of assets performed by financial intermediaries.*

smoothing" function to stabilize returns and insure investors against risks that cannot be diversified at a given point in time. This involves building up reserves of liquid and safe assets in good times, on which banks can draw to shield their customers from the liquidity shocks to which they may be subject over time.

This capacity to absorb risk on an intertemporal basis has precisely been at the base of liquidity production by banks. But with increasing competition from markets in the collection of resources, and the emergence of more attractive market products for investors, banks have found it more difficult to manage risks (and consequently produce liquidity) that way: this is precisely reflected in the change in the composition of banks' balance sheets in developed countries over the long run, with the decline in cash holdings and traditional liquid assets.

Instead, banks have increasingly used derivatives and similar techniques for managing risks. These market-based techniques are well adapted to "cross sectional risk sharing" (*i.e.* achieved through exchanges of risks among investors at a given point in time). Hence the development of credit risk transfer activities in the markets, based on credit derivatives and asset securitization. This development has led to the "commoditization" of credit risk. Financial innovation has enabled risks to be sliced and diced, and traded on their own or rebundled in the form of new products. This greater ability to trade risks and assets through market transactions in itself enhances the liquidity of the financial system. New financial structures engaged in maturity transformation, and acting more or less like banks have also emerged (money market mutual funds, securitization vehicles, etc.), which contributes to liquidity production, at least in normal times, as long as there is some maturity mismatch in their balance sheet and that this situation is sustainable.

In the process, banks have reduced their holding of non-tradable claims and increasingly behaved like non-bank financial intermediaries. Banks still provide liquidity in this way, but they are also more dependent on the market for ensuring their own liquidity, which constitutes a major change.

By putting greater demands on capital markets, banks (and other financial intermediaries) basically rely on other investors' ability and willingness to step in to provide cash exactly when needed. Both models of liquidity provision (through traditional, relationship-based intermediation and through arm's-length, market-based finance) certainly rest on confidence. But the first regime is more institutionalized: the source of liquidity is in this case clearly identified: *i.e.* banks' balance sheets. Conversely, the new regime has diluted the sources of liquidity. They stem from multilateral, anonymous relationships in the marketplace, which makes them even more confidence-sensitive and probably more fragile.

2| ON THE BORDERS OF ILLIQUIDITY

The marketisation of liquidity goes hand in hand with the proliferation of innovative bespoke instruments that lack deep, "battle-tested" secondary markets. By nature, their lack of transparency for investors is an impediment to the maturation of such secondary markets and even, sometimes, to the existence of an observable market price. Moreover, by feeding leverage, financial engineering increases the probability of market illiquidity and, at the same time, gives investors a misleading sense of liquidity.

2|1 Informational failures at the core of liquidity risk

LIQUIDITY AS A COGNITIVE PROBLEM

For an asset to become easily negotiable, it has to be turned into a common item for trade, *i.e.* standardized somewhat. The more an asset has a transparent economic value, whose features can be credibly communicated to a large investor base, the greater its potential liquidity. Indeed, standardisation reduces the need to make costly investment to get detailed information, and reinforces the certainty of the nominal value attached to any liquid asset. As some sociologists nicely put it, liquidity is also "a problem of public knowledge about economic assets",[5] and relies on people's ability to formalize the income streams and events that affect the value of these assets.

5 *See Carruthers* et al. *(1999) who ascribe the "liquidification" of the US secondary mortgage market to the process of homogenization organized by government agencies (Fannie Mae, Ginnie Mae and Freddie Mac) through the setting of formal standards and uniform protocols for underwriting mortgage transactions.*

Many institutional arrangements can improve the understanding of assets, thus making them more acceptable: certifications, credit enhancements (such as those provided by monoline insurers), the fungibility technique[6] or agency ratings for instance. The creation and development of organised exchanges for derivatives is clearly one of those innovations that simplified the trading process for many goods, by setting a common informational environment for traders. Obviously, it is easier to standardise the contractual terms of derivatives than the physical underlying commodity to be delivered. This accounts, for example, for the fluidification and growth of energy markets in the recent years. In the same vein, ISDA (International Swaps and Derivatives Association) master agreements have boosted the development and liquidity of credit default swaps (CDS) markets.

The basic process of securitisation also corresponds to this logic, when it is based on homogenous claims. It then allows the creation of information on the pool of underlying assets and diminishes the informational requirements for investors. Securitisation contributes to mitigate informational problems. The pooling of homogenous assets is a way to reduce adverse selection problems for investors (the probability of selecting low-performing assets), since the performance of a pool is more predictable than the performance of individual assets. This, in principle, helps investors to discriminate between sellers of good and bad products. In addition, tranching the proceeds stemming from the pool of assets according to their risk of default mitigates moral hazard problems (the probability that the seller will not monitor the risks carefully after their securitisation), when the seller commits to bear the first losses.

Cognitive failures in the securitised financial system

Nevertheless, for a large part, the creation of securities collateralised by assets has not been accompanied by the information needed by market participants to fully control their investments. The substantial information costs in structured finance is a factor that should limit the investor base. As centralised sources of information, rating agencies may in principle alleviate this cognitive burden, and indeed in recent years some less sophisticated investors have bought structured products by relying on ratings. But rating agencies could not eliminate completely information gaps. This is particularly true for market liquidity risk, which is difficult to summarise in a simple rating.

First and foremost, the piling up of securitisation layers that largely characterises complex products markets, tends to conceal the amount of commitments and embedded leverage in the marketplace. This results in considerable valuation difficulties, especially for products that are very infrequently traded and that lack comparability with similar assets. In normal circumstances –or if these products are part of a "buy and hold" strategy– this feature is innocuous for market liquidity. But it can turn to a serious threat when urgent demands on liquidity crop up, and when they prompt forced selling.

The difficulty or inability to assess the true value of assets for some structured products is in itself a major cause of the propagation of liquidity crises. This creates all the conditions of a "market for lemons". In general terms, a substantial flow of sell orders for an asset is likely to arouse the suspicion that initiators of transactions have privileged information on the quality of this asset, and lead potential buyers to demand an important price discount in exchange. In such a "market for lemons", the drop in the price may even lead to the total disappearance of the market, as demonstrated by Akerlof (1970) in a founding theoretical paper, and as illustrated, notably, in the US ABCP market this summer, where people became suddenly reluctant to buy such securities. It appears that the more customised the products are, the more they are prone to such bouts of distrust on the part of investors.

This is precisely why a liquidity crisis originating from complex structured products markets manifests itself as a "flight to simplicity", benefiting US Treasury bills for instance. This flight to the most understandable assets can have detrimental effects even for markets that in principle had no reason to be affected but were not fully transparent. For example, *AAA* tranches –in principle the safest– of collateralised loan obligations (CLOs) suffered from a drying-up of issuance simply because they were part of the assets of ABCP conduits and SIVs,[7] the most critical structures in the crisis. It is likely that, from now on, those investors that have

6 *By which new government bonds, for example French OATs, are issued with exactly the same properties as those of earlier lines.*
7 *Structured investment vehicles are special purpose structured finance operating companies, off-balance sheet, that fund a diversified portfolio of highly rated assets by issuing asset-backed commercial paper (ABCP), medium-term notes and capital. Their aim is to generate a spread between the yield of the portfolio and the vehicle's cost of funding, by managing credit and liquidity risk.*

permanent liquidity needs (asset managers and bank-related funds) will decide to turn to simple or highly standardised forms of securitised instruments (securities backed by pools of homogenous assets). Other investors, able to hold assets to maturity (life insurers, pension funds, etc.) are normally in a better position to invest in illiquid structured products like CDOs or CLOs since they are more interested in the revenue flows generated by these assets than by their market value at a point in time.

All in all, the securitised financial system is particularly prone, in some non-standard and opaque segments, to crises of valuation and confidence. Hence the risk of a sudden loss of confidence and market making, and the disruption of liquidity in the underlying markets.

2|2 Risk dispersion and systemic illiquidity

Confidence and liquidity are not only threatened by the limitations of information processing capabilities of investors, but also by the deficiencies in the control of risks created by issuers and originators in a highly securitised world. In fact, it is questionable whether greater ability to spread risks necessarily leads to a more resilient financial system. Better risk dispersion does not mean that risks disappear altogether. It can even be argued that they may increase on an aggregate level.

A MINSKIAN READING OF FINANCIAL INNOVATION AND LIQUIDITY

As early as the 1950s, Hyman Minsky developed the argument that financial innovation could lead to a rise in systemic illiquidity. Contrary to the conventional wisdom that regards the growth of markets for tradable instruments as reducing the risk of liquidity crises, Minsky (1986) considers that every innovation that leads both to new ways to finance business and new substitutes for cash assets in fact implies a growing exposure to illiquidity risk on an aggregate level. This is because the value of financial instruments relative to the quantity of means of payment cannot rise indefinitely without jeopardising the ability to redeem the debts incurred. Indeed, an increase in *leverage* in the system makes it more vulnerable to a sudden re-appraisal of risks and abrupt shifts in the liquidity demand from investors, including banks. An unexpected rise in the liquidity preference, like the one that occurred in the interbank market this summer, is always a threat to the fluid and normal circulation of liquidity in the markets.[8]

This fragility is concealed in periods of euphoria, when it seems painless to fund illiquid long-term assets with short-term, presumably liquid liabilities, *i.e.* when the distinction between near-moneys and money proper fades away. Then, the "transformation risk" is overlooked. But it comes to the forefront again when distress erupts. As distress cascades through the system, liquidity providers turn into liquidity demanders. The scope of leverage has been considerably increased with financial engineering:[9] this appears as a threat to the robustness of liquidity.

The ability to dispose of risks may have generated bad incentives, and fuelled excess risk-taking by the banking sector through less monitoring and screening of borrowers and increased leverage. Securitisation indeed creates an agency problem between the originator and the ultimate holder. In order to maximise fees, the originator has an incentive to maximise the volume of structured products from loans and is, to some extent, less motivated to care about the quality of loans that are not meant to remain on its balance sheet. Some evidence has been found that banks using the loans sales market for risk management purposes hold less capital and make more risky loans than other banks.[10] Not only do banks not necessarily take fewer risks with the use of credit risk transfer instruments, but they have also created additional (potential) risks in the system through innovation, when selling non-standard risks to the market or through the use of highly leveraged structures, with short-term financing, that increase the likelihood *and* the potential market impact of a distressed liquidation.

8 *Hence, liquidity is not primarily a question of aggregate quantities. It is fundamentally lodged in the preferences and constraints of economic agents.*
9 *For example, constant proportion debt obligations (CPDO) vehicles –one of the newest creations in credit markets– borrow up to 15 times their capital to insure an index of bonds (such as the iTraxx) against default.*
10 *See Cebenoyan and Strahan (2004). Hänsel and Krahnen (2007) also document that the issue of CDOs tends to raise the systematic risk of the issuing banks.*

MARKING-TO MARKET AND THE PROPAGATION OF LIQUIDITY CRISES

The illusion of "disposable risk" and the common belief that those who hold risks are better prepared to absorb and manage them properly have been challenged in the recent turbulence. This is especially true for money market funds that have invested in complex, long-term products, on the basis of their rating exclusively.

In the long chain of securitisation, some presumed risk absorbers proved in fact to be a source of distress contagion between markets. A key reason for this is that structurally, financial institutions have become more sensitive to fluctuations of market prices with the decline in traditional intermediation.

SIVs in particular, must mark their portfolio to market on a frequent basis to gauge their net asset value. The problem is that the balance sheet of SIVs is characterised by a duration and liquidity mismatch, with rather illiquid positions on the asset side and short-term securities on the liabilities side, granting investors the right to exit their investment easily.[11] When SIVs found themselves unable to roll over their short-term liabilities, they were forced to liquidate their assets at a large discount and to record, on a mark-to-market basis, significant losses in their balance sheets. This was one of the vectors of contagion of the liquidity crisis this summer.

More generally, the reactions of institutions to price changes and measured risks generate procyclical adjustments in their balance sheets and hence in markets, which tends to propagate financial difficulties and lead to a liquidity squeeze.[12] Similarly, sellers of protection (for example insurers) might strain liquidity through hedging operations on security markets when they mark their exposures to market on a daily-basis.

As a result of this situation, traditional liquidity providers may have difficulty in intervening in times of stress, since they themselves need to draw liquidity from the markets when it is scarce.

The deep changes in banks' balance sheets (and off-balance positions) over the last twenty years may have affected the "qualitative asset transformation" services they offer to investors, since they are less willing to warehouse and manage the risks themselves. As mentioned previously, there cannot be liquidity creation without an agent accepting to bear and manage the risks incorporated in the initial, illiquid assets. By becoming liquidity demanders through the transfer of their risks to other financial intermediaries, banks may have obscured their own responsibilities in insuring liquidity in "second-to-last resort", which requires a close monitoring of their risks. For example some banks, in the recent financial turbulence, failed to assume their implicit responsibilities as refinancers for their conduits (IKB, SachsenLB).

In fact, part of the credit risk transferred to the market by the banking system remains liable to re-emerge suddenly and unexpectedly on bank's books via *loan commitments, or loans sold with recourse for instance,[13] even when no legal ties between banks and securitisation entities exist but reputational concerns are at stake. This* forced re-intermediation *is the very evidence that the production of liquidity does not depart from banks without risks. In the subprime crisis, regulated institutions have been, rather surprisingly, more affected than the others, at the periphery of the system (hedge funds, private equity funds, etc.), precisely because banks had poorly assessed their liquidity needs stemming from their sponsoring activity and their off-balance sheet vehicles.*

.../...

11 *That is to say that SIVs act in a similar way to banks, but without bearing the same constraints and without benefiting from the same stability of resources on the liabilities side.*
12 *See Adrian and Shin (2008), in this issue, on the links between mark-to-market practices and leverage.*
13 *In the case of loans sold with recourse, the buyer has the option to sell the loan back to the bank at a pre-arranged price if the borrower's quality deteriorates, which generates risk for the selling bank.*

Still, commercial banks have a special capacity and interest in offering options to such conduits that other institutions do not have to the same extent. In the crisis, banks with a large base of stable deposits have proved more resilient than investment banks. Actually, it can be argued that banks have an advantage in hedging liquidity risk.[14] This seems consistent with the notion developed in Section 1, that there is a natural complementarity in traditional monetary intermediation between loan commitments (drawn down during the crisis) and deposits (flowing into the most credible banks in the crisis). Indeed, Gatev and Strahan (2004) found that banks were at the centre of liquidity inflows during the 1998 crisis, which enabled them to provide liquidity to stressed firms.

At least for reputation reasons, it appears that banks have interest in avoiding the failure of conduits. In addition, bank sponsors are themselves direct investors in the capital notes. Therefore it may also be in their economic interest to maintain funding and avoid failures that could lead to the collapse of the capital notes market. They can do so by acting as marker makers (through the purchase of commercial paper and capital notes from the conduits, or by buying assets from them at par rather than market value) or by granting credit lines to them. It also behoves the structurers to make up for the lack of secondary markets for some tailor-made products that remain de facto *very dependent on their issuers.*

Admittedly, banks are unlikely to take all credits back onto their balance sheets. There is certainly no question of an indiscriminate scaling back of securitisation. But the relative illiquidity of bank assets, duly recognised and managed, may also have beneficial effects, as it creates an incentive for banks to limit their exposure to avoid forced selling (and its costs) in a liquidity crisis.[15]

The ability of risk absorbers to ascribe an adequate value to complex products turns out to be key in the control of liquidity risk.[16] In particular, it is necessary for banks selling complex bespoke products to price them taking into account their own ability to trade and hedge such an exposure. Otherwise, they might sell products beyond their capacity to properly hedge them when markets become tight.

The "liquidity frontier" cannot be pushed back indefinitely. Those who, in the end, accept illiquidity in their balance-sheet must clearly understand and control the risks they are taking on. Such illiquidity is more acceptable for investors with long time horizons, and who are not subject to creditors suddenly calling their money at short notice.[17] For the others, larger liquidity buffers acting as an automatic stabiliser to smooth the financial cycle might be necessary to hedge their risks.

Without such precautions, financial innovation could unduly extend the liquidity insurance implicitly expected of central banks. Yet, it is certainly not the role of a central bank to prompt market participants to rush into "not-so-reliable liabilities".

14 *See Gatev and Strahan (2004).*
15 *On this point, see Wagner (2007).*
16 *See Bervas (2006).*
17 *It may be noted that such simple devices as lock-up periods in the hedge fund industry can assist in curbing the pathological rise of liquidity preference that may, at times, sweep through the financial system. This has actually been material in the recent turmoil.*

BIBLIOGRAPHY

Akerlof (G.) (1970)
"The market for 'lemons': quality uncertainty and the market mechanism", *Quarterly Journal of Economics,* vol. 84, n° 3

Allen (F.) and Carletti (E.) (2007)
"Banks, markets and liquidity", *Working Paper*

Allen (F.) and Gale (D.) (1997)
Financial markets, intermediaries, and intertemporal smoothing", *Journal of Political Economy*, vol. 105, n° 3, pp. 523-546

Allen (F.) and Santomero (A.M.) (1999)
"What do financial intermediaries do?", *Working Paper*

Bhattacharya (S.) and Thakor (A.V.) (1993)
"Contemporary banking theory", *Journal of Financial Intermediation* 3 (1): 2-50

Bervas (A.) (2006)
"Market liquidity and its incorporation into risk management", Banque de France, *Financial Stability Review*, n° 8

Carruthers (B.G.) and Stinchcombe (A.L.) (1999)
"The social structure of liquidity: flexibility, markets and states" *Theory and Society*, vol. 28, n° 3, pp. 353-382

Cebenoyan (A.S.) and Strahan (P.E.) (2004)
"Risk management, capital structure and lending at banks" *Journal of Banking & Finance,* vol. 28, pp. 19-43

Diamond (D.) (1997)
"Liquidity, banks, and markets", *The Journal of Political Economy*, vol. 105, n° 5, pp. 928-956

Diamond (D.) and Dybvig (P.) (1983)
"Bank runs, deposit insurance and liquidity", *Journal of Political Economy*, n° 91

Gatev (E.) and Strahan (P.E.) (2004)
"Banks' advantage in hedging liquidity risk: theory and evidence from the commercial paper market", Wharton, Financial Institutions Center

Gorton (G.B.) and Pennacchi (G.G.) (1995)
"Bank and loan sales. Marketing nonmarketable assets", *Journal of Monetary Economics*, pp. 389-411

Gurley (J.G.) and Shaw (E.S) (1960)
Money in a theory of finance, The Brookings Institution

Hänsel (D.) and Krahnen (J.P.) (2007)
"Does credit securitization reduce bank risk? Evidence from the European CDO market", Center for Financial Studies *Working Paper*

Hicks, (J.R.) (1969)
A theory of economic history, Oxford University Press.

Kashyap (A.K.), Rajan (R.) and Stein (J.C.) (2002)
"Banks as liquidity providers: an explanation for the coexistence of lending and deposit-taking", *The Journal of Finance*, vol. LVII, n° 1

Minsky (H.P.) (1986)
Stabilizing an unstable economy, Yale University Press

Merton (R.C.) (1992)
"Financial innovation and economic performance", *Journal of Applied Corporate Finance*, 4(4), pp. 12-22

Shin (H.S.) and Adrian (T.) (2008)
"Liquidity and leverage", *this issue*

Shin (H.S.), Plantin (G.) and Sapra (H.) (2005)
"Marking to market, liquidity, and financial stability", *Monetary and Economic Studies*, vol. 23, issue S1, pp. 133-155.

Wagner (W.) (2007)
"The liquidity of bank assets and banking stability", *Journal of Banking and Finance*, 31, pp. 121-139